SEMENYUSHKIN, I.N., kand.fiz.-matem.nauk; CHUVILO, I.V., kand.fiz.-matem.nauk

V.I.Veksler, laureate of the Atoms for Peace Award. Priroda 52 no.10:108-109 '63. (MIRA 16:12)

1. Ob"yedinennyy institut yadernykh issledovaniy, Dubna.

CHUVILO, I.V.

Weak interactions of elementary particles. Atom. energ. 16 no.2:160-163 F '64. (MIRA 17:3)

L 47331-65 FSS-2/EWT(l)/EWP(e)/EWT(m)/EWG(m)/EWP(t)/EWP(k)/EWP(z)/EWP(b) 41
Pz-6/Pad/Pf-4 IJP(c) RWH/JD/HW B

ACCESSION NR: AP5010876 UR/0286/65/000/007/0052/0052

AUTHORS: Lidorenko, N. S.; Cherkasskiy, A. Kh.; Adamyan, R. G.; Chuvpilo, A. V.; Savel'yev, G. M.; Shchegolev, I. S.

TITLE: A method for preparing the positive electrode of a nickel zinc storage battery. Class 21, No. 169620

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 7, 1965, 52

TOPIC TAGS: battery, storage battery, electrode

ABSTRACT: This Author Certificate presents a method for preparing the positive electrode of a nickel-zinc storage battery. The method is based on powder metallurgy technology and is designed to decrease the leakage of the battery while it is in storage. The positive (nickel) electrode is coated with a thin layer of metallic silver by chemical means.

ASSOCIATION: none

SUBMITTED: 27May63 ENCL: 00 SUB CODE: EE

NO REF SOV: 000 OTHER: 000

Card 1/1

L 41601-65 EWT(m)/T/EWA(m)-2
ACCESSION NR: AP5007715 S/0367/65/001/001/0134/0144

AUTHOR: Pantuyev, V.S.; Khachaturyan, M.N.; Chuvilo, I.V.

TITLE: Total cross sections for the interactions of neutrons with protons and neutrons in the energy interval for 2.6 to 8.3 GeV

SOURCE: Yadernaya fizika, v. 1, no. 1, 1965, 134-144

TOPIC TAGS: total np cross section, total nn cross section, high energy NN interaction, neutron proton scattering, neutron neutron scattering, neutron bombardment

ABSTRACT: Existing information concerning the effective neutron-proton interaction cross section (see, e.g., J.H. Atkinson, W.N. Ness, V. Perez-Mendez, R. Wellace, Phys. Rev., 123, 1856, 1961; Palevsky, Bull. Amer. Phys. Soc, 9, 94, 1964) fails to establish any useful pattern of effective cross section behavior in the high-energy region and, consequently, one cannot carry out a comparison with effective cross sections for interactions among other elementary particles. In addition, one would also like to check the hypothesis concerning the asymptotic behavior of cross sections in the high-energy domain. Consequently, the total cross section for the nn and np interactions has been measured under good geometrical conditions ($\theta = 0.228°$) with incident neutrons having

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mean effective energies of 2.6, 3.9, 5.5, 6.9, and 8.3 GeV. The results

E_n, GeV:	2,6	3,9	5,5	6,9	8,3
σ_t (np), mb:	38,1±2,6	43,4±1,6	41,2±1,7	39,3±1,7	40,8±1,9
σ_t (nn), mb:			34,8±1,6		31,5±1,7

are in good agreement with theoretical (np) values calculated using the Regge pole theory. The average screening correction of 7.8 ± 2 mb agrees well with the theoretical value of 7.2 mb given by R. I. Glauber (Phys. Rev., 100, 242, 1955). The article describes the experimental technique and methods for the calculation of corrections and errors in considerable detail. "The authors thank Academician V.I. Veksler for his cooperation and constant interest in the work, V.I. Ivanov for help during the measurements, Yan Fu-Ch'ing for programming, and L.P. Zinov'yev, M.I. Yatsutu and the entire personnel of the proton synchrotron department for maintaining a stable operation of the accelerator over extended intervals of time." Orig. art. has: 8 formulas, 7 figures, and 3 tables.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute for Nuclear Studies)

L 41601-65
ACCESSION NR: AP5007715 0

SUBMITTED: 01Jul64 ENCL: 00 SUB CODE: NP

NO REF SOV: 004 OTHER: 013

me
Card 3/3

L 41602-65 EWT(m)/T/EWA(m)-2

ACCESSION NR: AP5007716 S/0367/65/001/001/0145/0147

AUTHOR: Azimov, M.A.; Pantuyev, V.S.; Sil'vestrov, L.V.; Khachaturyan, M.N.; Chuvilo, I.V.

TITLE: Pion charge exchange cross section at 4 GeV/c

SOURCE: Yadernaya fizika, v. 1, no. 1, 1965, 145-147

TOPIC TAGS: pion proton charge exchange, pion high energy scattering, pion charge exchange cross section, Gamma spectrometer

ABSTRACT: Existing experimental data concerning the charge exchange π^- -scattering on hydrogen usually refer to the energy region below 2 GeV. In addition, such cross sections in the energy domain above 1 GeV are usually obtained using chambers, and they therefore represent only an estimate of the upper limit of the charge exchange cross section. Consequently, using the Cerenkov γ-spectrometer, the cross section for the negative pion charge exchange $\pi^- + p \rightarrow \pi^0 + n$ was measured at 4.1 GeV/c. The value of the cross section was found to be $\sigma_{exp} = 0.12 + 0.02$ mb. The article briefly describes the kinetics of the

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L 41602-65
ACCESSION NR: AP5007716

2

process, the geometry of the experiment, the equipment, and the calibration of the Cerenkov γ-spectrometer. "The authors thank M.I. Podgoretskiy for numerous consultations and constant interest in the work." Orig. art. has: 1 formula and 4 figures.

ASSOCIATION: Ob" yedinennyy institut yadernykh issledovaniy (Joint Institute for Nuclear Studies)

SUBMITTED: 01Sep64 ENCL: 00 SUB CODE: NP, OP

NO REF SOV: 001 OTHER: 000

Card 2/2 mc

KURBATOV, V.S.; MAL'TSEV, E.I.; MASLAKOV, A.I.; STARKOV, G.M.; CHUVILO, I.V.; SHKLOVSKAYA, A.I.

Determining the electron energy in the range of 20 to 250 Mev. in a xenon bubble chamber. Prib. i tekh.eksp. 10 no.5:61-63 S-O '65. (MIRA 19:1)

1. Ob"yedinennyy institut yadernykh issledovaniy, Dubna. Submitted July 21, 1964.

CHUVILOV, M.I.

Restoration of snow protective tree plantings. Put' i put. khoz. 7 no.11:40-41 '63. (MIRA 16:12)

1. Zamestitel' nachal'nika distantsii zashchitnykh nasazhdeniy, stantsiya Kartaly, Yuzhno-Ural'skoy dorogi.

CHUVILOV, M.I.

Pruning branches along the side of railroad lines. Put' i put. khoz. no.2:42-44 F '58. (MIRA 11:3)

1. Zamestitel' nachal'nika distantsii zashchitnykh lesonasazhdeniy, stantsiya Kartaly Yuzhno-Ural'skoy dorogi.
(Railroads) (Pruning)

CHUVILOV, N.I.

Shrubs in shelterbelts. Puti i put. khoz. no.4:21 Ap '59.
(MIRA 13:3)

1.Zamestitel' nachal'nika distantsii zashchitnykh lesonasazhdeniy, stantsiya Kartaly, Yuzhno-Ural'skoy dorogi.
(Railroads--Snow protection and removal)
(Windbreaks, shelterbelts, etc.)

CHEREVATSKAYA, O.M.; CHUVILOVA, V.A.

Effect of phosphates on the electrode potentials of steels. Izv.vys. ucheb.zav.;khim.i khim.tekh. 6 no.4:688-692 '63. (MIRA 17:2)

1. Chelyabinskiy politekhnicheskiy institut. Kafedra obshchey khimii.

CHEREVATSKAYA, O.M.; CHUVILOVA, V.A.

Effect of anodic inhibitors on the electrode potential of various steels. Izv.vys.ucheb.zav.; chern.met. no.7:184-192 '60. (MIRA 13:8)

1. Chelyabinskiy politekhnicheskiy institut.
(Steel alloys--Electric properties)
(Corrosion and anticorrosives)

CHEREVATSKAYA, O.M.; CHUVILOVA, V.A.

Effect of anode inhibitor mixtures on electrode potentials in steel. Izv. vys. ucheb. zav.; chern. met. 5 no.7:151-157 '62. (MIRA 15:8)

1. Chelyabinskiy politekhnicheskiy institut.
(Steel--Electrometallurgy) (Electrolytes)

05842

28(4) SOV/76-33-10-40/45

AUTHORS: Vetyukov, M. M., Chuvilyayev, R. G., Shkol'nikov, S. N.

TITLE: Automatic Balance for Vapor Pressure Measurement by the Dynamic Method

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 10, pp 2370 - 2371 (USSR)

ABSTRACT: A balance is described here (Fig) which permits simultaneous automatic recording of temperature and variations in the sample weight. It is in principle a steel spiral on which the test vessel (with the sample) is suspended. The test vessel is suspended in an electric furnace: 1). Below the spiral on the wire which bears the test vessel an aluminum foil is fastened which serves as a screen from light beems. The light beam is emitted by a small lamp, passes through a collimator lens, and incides upon a photoelectric multiplier of the FEU-11 type the pulses of which are recorded by an EPP-09 electronic potentiometer. The position of the aluminum foil varies by changing the sample weight, the light beam is weakened accordingly, and the weight change may thus be recorded. This system may be applied

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05842

Automatic Balance for Vapor Pressure Measurement by the Dynamic Method SOV/76-33-10-40/45

to any spring balance suited for continuous weight control. There is 1 figure.

ASSOCIATION: Politekhnicheskiy institut im. M. I. Kalinina, Leningrad (Polytechnic Institute imeni M. I. Kalinin, Leningrad)

SUBMITTED: March 25, 1959

Card 2/2

VETYUKOV, M.M.; SHKOL'NIKOV, S.N.; CHUVILYAYEV, R.G.; NOVIKOV, A.N.
(Moskva)

Torsion pendulum viscosimeter with automatic reading.
Zhur. fiz. khim. 34 no.2:470-472 F '60. (MIRA 14:7)
(Viscosimeter)

VETYUKOV, M.M.; ISLAMOVA, R.G.; CHUVILYAYEV, R.G.

Anode consumption during aluminum electrolysis. Izv.vys.ucheb. zav.; tsvet.met. 5 no.3:80-88 '62. (MIRA 15:11)

1. Leningradskiy politekhnicheskiy institut, kafedra elektropirometallurgii tsvetnykh metallov.
(Aluminum--Electrometallurgy)

VETYUKOV, M.M.; CHUVILYAYEV, R.G.

Behavior of carbon "foam" during the electrolysis of cryolite-alumina melts. Izv. vys. ucheb. zav.; tsvet. met. 7 no.6:74-81 '64. (MIRA 18:3)

1. Leningradskiy politekhnicheskiy institut, kafedra elektrometallurgii tsvetnykh metallov.

VETYUKOV, M.M.; CHUVILYAYEV, R.G.

Investigating the anodic process during the electrolysis of cryolite-alumina melts. Izv.vys.ucheb.zav.; tsvet.met. 8 no.2:65-71 '65. (MIRA 19:1)

1. Kafedra elektrometallurgii tsvetnykh metallov, Leningradskiy politekhnicheskiy institut. Submitted January 30, 1964.

CHUVIN, A.V.; KOVALEV, A.I.

For further developments in river transportation. Rech.transp. 14 no.4:5-7 Ap '56. (MLRA 9:8)
(Inland water transportation)

CHUVIN,V.; POLTAVSKIY,A.

Installation and use of freon automatic cooling installations.
Mor.flot 15 no.6:22-23 Je '55. (MLRA 8:8)
(Refrigeration on ships)

CHUVIN, V.; POLTAVSKIY, A.

[redacted]

The position of temperature-controlling valves. Khol.tekh. 32 no.4:60 O-D '55. (MIRA 9:4)
(Refrigeration and refrigerating machinery)(Automatic control)

VERKHOSHAPOV, A., kand.tekhn.nauk, dotsent; CHUVIN, V., starshiy inzh.

Corrosion of shell and tube condensers in cooling plants. Mor. flot 22 no.1:29-30 Ja '62. (MIRA 15:1)

1. Odesskiy tekhnologicheskiy institut pishchevoy i kholodil'noy promyshlennosti (for Verkhoshapov). 2. Chernomorskoye parokhodstva (for Chuvin).
(Refrigeration and refrigerating machinery--Corrosion)

CHUVIN, V.P.; KULIKOV, O.T., inzh.; LADIN, M.N., inzh.; LATSKIY, V.I., inzh.; ZIMIN, V.A., inzh.; LEVCHENKO, K.P., inzh.; LEVIN, S.S., inzh.; SERGEYEV, V.V., inzh.

"Ural-61" boring machine. Gor.zhur. no.2:53-55 F '64. (MIRA 17:4)

1. Glavnyy instruktor Magnitogorskogo zavoda gornogo oborudovaniya (for Chuvin). 2. Nauchno-issledovatel'skiy i proyektno-konstruktorskiy institut gornogo i obogatitel'nogo oborudovaniya, Sverdlovsk (for Latskiy, Zimin, Levchenko, Levin, Sergeyev).

CHUVIKOVSKIY, V.S., doktor tekhn. nauk; POSTNOV, V.A., kand. tekhn. nauk

Development of A.N. Krylov's ideas in the field of ship vibration. Sudostroenie 29 no.8:21-24 Ag '63. (MIRA 16:10)

(Vibration (Marine engineering))
(Krylov, Aleksei Nikolaevich, 1863-1945)

VISHNEPOL'SKIY, S.A., kand. ekon. nauk; BAYEV, S.M., inzh. putey soobshcheniya; BONDARENKO, V.S.; RODIN, Ye.D.; CHUVLEV, V.P.; TURETSKIY, L.S.; SMIRNOV, G.S.; SHAPIROVSKIY, D.B.; OBERMEYSTER, A.M.; SINITSIN, M.T.; KOGAN, N.D.; PETRUCHIK, V.A.; GRUNIN, A.G.; KOLESNIKOV, V.G.; MARTIROSOV, A.Ye.; KROTKIY, I.B.[deceased]; ZENEVICH, G.B.; MEZENTSEV, G.A.; KOLOMOYTSEV, V.P., kand. tekhn. nauk; ZAMAKHOVSKAYA, A.G., kand. tekhn. nauk; MAKAL'SKIY, I.I., kand. ekon. nauk; MITROFANOV, V.F., kand. ekon. nauk; CHILIKIN, Ya.A.; BAKAYEV, V.G., doktor tekhn. nauk, red. Prinimali uchastiye: DZHAVAD, Yu.Kh., red.; GUBERMAN, R.L., kand. ekon. nauk, red.; RYABCHIKOV, P.A., red.; YAVLENSKIY, S.D., red.; BAYRASHEVSKIY, A.M., kand. tekhn. nauk, red.; POLYUSHKIN, V.A., red.; BALANDIN, G.I., red.; ZOTOV, D.K., red.; RYZHOV, V.Ye., red.; BOL'SHAKOV, A.N., red.; VUL'FSON, M.S., kand. ekon. nauk, red.; DMITRIYEV, V.I., kand. ekon. nauk, red.; ALEKSANDROV, L.A., red.; LAVRENOVA, N.B., tekhn. red.

[Transportation in the U.S.S.R.; marine transportation] Transport SSSR; morskoi transport. Moskva, Izd-vo "Morskoi transport," 1961. 759 p. (MIRA 15:2)

(Merchant marine)

CHUVPYLO, P.P.

Testing elliptical tuyères. V. A. Sorokin, B. M. Nosovitskii, B. L. Tavrog, N. E. Dunaev, and P. P. Chuvpylo (Ind. Inst., Donets). *Stal'* 15, 107–13(1955).—In a 600-ton blast furnace elliptical tuyères widened the active zone of the hearth, lowered gas pressure, led to a higher blast temp., and increased production by 3.03%, while lowering coke consumption by 2.84%. Furnace performance is described minutely. J. D. Gat

(4)

PANEV, G.A.; KUZUB, A.G.; CHUVPYLO, P.P.; KAMARDIN, A.M.; NOVIKOV, I.S.; YAROSHEVSKIY, S.L.; POPOV, N.N., kand. tekhn. nauk

Effect of high temperature heating of the hearth on the operation of a blast furnace. Met. i gornorud. prom. no.2:9-11 Mr-Ap '65. (MIRA 18:5)

ROZENTAL', A.S., kand.med.nauk, GOYFMAN, M.A., CHUVYCHKIN, Yu.I.

Control of pyodermia among builders of the Kakhovka Hydroelectric Power Station. Vrach.delo no.5:523-526 My '58 (MIRA 11:7)

1. Kafedra kozhno-venericheskikh bolezney (zav. - dots. S.I. Mutuskov) Odesskogo meditsinskogo instituta i Khersonskiy oblastnoy kozhno-venerologicheskiy dispanser.
(SKIN--DISEASES)

CHUVYKIN, E., starshiy inzhener po tekhnike bezopasnosti

Attention to problems of visual propaganda on safety techniques.
Mor. flot 22 no.5:43 My '62. (MIRA 15:5)

1. Potiyskiy port.
(Merchant marine--Safety measures)

TREKHOV, N., polkovnik; CHUVYRIN, A., mayor

Food boilers operated on liquid fuel. Tyl i snab. Sov. Voor. Sil 21 no.11:89-90 N '61. (MIRA 15:1)

(Oil burners)
(Cookery--Equipment and supplies)

CHUV'YUKOV, N.V.

Absorption analysis of coals in the ultraviolet. Zav.lab. 26 no.2:164-167 '60. (MIRA 13:5)

1. Dnepropetrovskiy gornyy institut imeni Artema.
(Coal--Spectra)

CHUVYKIN,M.,

Mechanize the loading of the An-2 airplane. Grazhd. av. 12 no.4:35 Ap '55. (MLRA 8:9)

1. Zamestitel' komandira podrazdeleniya po politchasti (g. Rostov-na-Donu)
(Airplanes)

ACCESSION NR: AT4013960 S/2659/63/010/000/0246/0251

AUTHOR: Parfenov, N. K.; Chuyan, A. N.

TITLE: A study of oxidation kinetics in Mo-Al alloys

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny*m splavam, v. 10, 1963, 246-251

TOPIC TAGS: molybdenum alloy, molybdenum aluminum alloy, aluminum containing alloy, refractory alloy, refractory alloy oxidation, protective oxide

ABSTRACT: The study involved binary Mo-Al alloys containing 21-95% Mo and exposed to oxidation in air at temperatures of 700-1200C for periods up to 10 hours. The rate of oxidation was calculated for these conditions. Specimens with various Al contents were subjected to chemical analysis after smelting and were then tempered in a vacuum for 25 hours at the indicated temperatures. Results are shown, in part, graphically (see Figs. 1 and 2 in the Enclosure). The optimal temperature for the formation of protective oxides in the process of oxidation of Mo-Al alloys was 1100C. Complex MoAlO oxides were found to form during the process of oxidation and their crystal lattices were characterized. Alloys containing 36% Al or less did not show loss of Mo in the form of MoO_3. A complex oxide forms at 1100C in alloys containing more than 36% Al, preventing loss of Mo and protecting

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ACCESSION NR: AT4013960

the alloy against further oxidation. Orig. art. has: 3 tables, 2 graphs.

ASSOCIATION: Institut metallurgii AN SSSR (Institute of Metallurgy)

SUBMITTED: 00 DATE ACQ: 27Feb64 ENCL: 02

SUB CODE: ML NO REF SOV: 003 OTHER: 004

Card 2/2

L 13980-65 EWP(e)/EPA(s)-2/EWT(m)/EPF(n)-2/EPA(w)-2/EWP(t)/EWP(b) Pab-10/
Pt-10/Pu-4 ASD(m)-3 JD/JG/MLX/WH

ACCESSION NR: AT4046835 S/0000/64/000/000/0155/0158

AUTHOR: Parfenov, N. K.; Chuyan, A. M.

TITLE: Study of the oxidation kinetics of Mo-Al-Si alloys

SOURCE: AN SSSR. Nauchny y sovet po probleme zharoprochny*kh splavov. Issledovaniya staley i splavov (Studies on steels and alloys). Moscow, Izd-vo Nauka, 1964, 155-158

TOPIC TAGS: molybdenum alloy, aluminum containing alloy, silicon containing alloy, oxidation, oxide layer, composition

ABSTRACT: Two ternary Mo-Al-Si alloys, one containing (wt%) 85.92 Mo, 6.90 Al, 7.18 Si, and the other 62.79 Mo, 27.63 Al, and 9.58 Si, were prepared by arc melting 99.94% pure Mo, 99.999% Al, and crystalline Si in an argon atmosphere; the interaction between Mo, Al, and Si with heating in air at 800—1200C was studied. At all oxidation temperatures, the first alloy had no weight gain, while the weight loss (caused by vaporization of MoO_3) increased as the oxidation temperature increased. A thick porous scale was formed on the specimen consisting of sillimanite ($Al_2O_3 \cdot SiO_2$), SiO_2 in the form of α-cristobalite, and α-tridymite, a

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L 13980-65

ACCESSION NR: AT4046835

complex $(Mo, Al)_2O_3$ oxide and mullite ($3Al_2O_3 \cdot 2SiO_2$). The oxidation kinetics of the recorded alloy follows a logarithmic rule at 900 and 1000C and an exponential rule at 1100 and 1200C. With a 5-hr exposure, the weight gain of this alloy was 0.059, 0.202, 0.097, and 0.176 mg/cm^2 hr at 800, 1000, 1100, and 1200C, respectively. With a 70-hr exposure the weight gain decreased to 0.008 and 0.11 mg/cm^2 hr at 1100 and 1200C, respectively. A thin, strong, dark-gray scale adhering to the base metal had the same components as the scale on the first alloy, even though they were formed at different oxidation temperatures. The higher oxidation rate of the first alloy as compared with the second alloy is explained by the fact that the first has an insufficient amount of Al to bind Mo into complex $(Mo, Al)_2O_3$ oxide, thus allowing free Mo to vaporize after oxidizing to MoO_3. Because of vaporization of Mo oxides and because of their small volume compared with that of the oxidized alloy, the scale formed from nonvolatile Al and Si oxides was not sufficiently dense to permit formation of complex oxides containing Mo, Al, and Si simultaneously. Orig. art. has: 2 figures, 1 table, and 4 formulas.

ASSOCIATION: none

Card 2/3

L 13980-65
ACCESSION NR: AT4046835

SUBMITTED: 16Jun64 ENCL: 00 SUB CODE: MM, GC

NO REF SOV: 001 OTHER: 000 ATD PRESS: 3137

Card 3/3

YEGOROVA, N.G.; KUZNETSOVA, V.Ye.; KUPRIKHIN, V.I.; MARTYNOV, B.P.; KUGAYEVA, V.A.; FEDOROVA, L.P.; CHUYAN, K.I.[deceased]; SHTRUK, G.G., inzh., red.; GORDEYEVA, L.P., tekhn.red.

[General engineering time norms for cold forging] Obshche-mashinostroitel'nye normativy vremeni na kholodnuiu shtampovku. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1959. 151 p. (MIRA 13:7)

1. Moscow. Nauchno-issledovatel'skiy institut truda. TSentral'-noye byuro promyshlennykh normativov po trudu.
(Forging)

L 50504-65 EWT(1)/EPA(w)-2/EEC(t)/EWA(m)-2 Pz-6/Pi-4 IJP(c) AT
ACCESSION NR: AP5012095 UR/0147/65/000/002/0132/0137

AUTHOR: Chuyan, R. K.

TITLE: An approximate method for calculating electrode geometry for the formation of a curvilinear plane-parallel beam of charged particles

SOURCE: IVUZ. Aviatsionnaya tekhnika, no. 2, 1965, 132-137

TOPIC TAGS: electron beam formation, ribbon beam, electrostatic focusing, electrode geometry, space charge theory, complex variable function

ABSTRACT: The problem of forming intensive beams of similarly charged particles by means of electrostatic fields is central to a whole complex of technical devices. This problem is broken down into two component parts: the internal problem in which, according to assigned beam trajectories, the kind of charged particles and a number of other variables, the field is found within the beam, with allowance for the particle's own charge; and the external problem in which the field is found outside the beam, on the basis of the solution of the internal problem. The author calls attention to the fact that the solution of the external problem makes possible the construction of an electrode system capable of ensuring a beam of prescribed form. The present article reports an attempt to obtain an approximate solution of

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L 50504-65
ACCESSION NR: AP5012095

the so-called external problem for the general case of plane-parallel intensive beams of charged particles with curvilinear boundaries. In the author's understanding, intensive beams are those in the consideration of which the effect of the space charge of the beam particles cannot be disregarded. The problem of determining the field outside the beam is reduced to a Cauchy problem for a Laplace equation. The solution of the problem formulated in this manner in the class of analytical functions is found analogously to Pierce's solution for a ribbon beam. In the practical solution of the external problem the author notes the advisability of a transition to a conformally transformed plane of a complex variable with the boundary of the beam represented as a segment of a straight line parallel to the abscissa. The question of the approximation of the numerical solution (or analytical expression giving the accurate solution) obtained for the internal problem by a certain holomorphic function is analyzed. The author emphasizes that, strictly speaking, this approximation is not completely legitimate. In order to make use of the method proposed in the article it is necessary, in effect, to go from the "true" beam to some other beam, as close to it as desired, with boundary conditions belonging to the class of functions in question. This type of substitution results in a derived solution which is substantially different from the unknown "true" solution

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L 50504-65
ACCESSION NR: AP5012095 0

at a great distance from the boundary of the beam. However, as the author is careful to point out, in the actual design of technical equipment it is important to know the electrostatic field in the immediately surrounding area of the beam, and here both solutions coincide with a fair degree of accuracy. By way of illustrating a particular instance of the application of the procedure outlined in the article, an analysis is made of the problem of constructing an electrode system for the formation of a ribbon beam under deceleration (Bremsstrahlung). Orig. art. has: 14 formulas and 2 figures.

ASSOCIATION: None

SUBMITTED: 10Feb64 ENCL: 00 SUB CODE: NP

NO REF SOV: 007 OTHER: 001

Card 3/3

CHUYANOV, A., inzhener; OL'SHANSKIY, I., inzhener; LAVRUSHIN, A., inzhener.

The leader in the meat packing industry; twentieth anniversary of the Moscow Meat Combine. Mias.ind. SSSR 24 no.6:5-8 '53. (MLRA 6:12)
(Moscow--Meat industry) (Meat industry--Moscow)

CHUYANOV, A.

Meeting the season for large-scale livestock processing. Mias. ind.SSSR 25 no.4:6-9 '54. (MLRA 7:8)

1. Glavnyy inzhener Moskovskogo myasokombinata.
(Meat industry)

CHUYANOV, A. [redacted]; VORONTSOV, S., inzhener; VOYNOVA, P., inzhener; LEONT'YEV, I., inzhener

What should be the equipment of a modern meat combine. Mias. ind. SSSR 26 no.3:30-37 '55. (MLRA 8:9)

1. Glavnyy inzhener Moskovskogo myasokombinata (for Chuyanov). 2. Moskovskiy myasopererabatyvayushchiy zavod (for Vorontsov). 3. Vsesoyuznyy nauchno-issledovatel'skiy institut myasnoy promyshlennosti (for Voynova). 4. Glavnoye upravleniye myasnoy promyshlennosti (for Leont'yev)

(Meat industry--Equipment and supplies)

CHUYANOV, A., inzh.

Regulation of wages in the meat industry. Mias. ind. SSSR 29 no.1:37-40 '58. (MIRA 11:3)
(Meat industry) (Wages)

CHUYANOV, A., insh.

New developments in the bonus policy for meat industry workers.
Miasn.ind.SSSR 30 no.6:40-42 '59. (MIRA 13:4)
(Bonus system) (Meat industry)

CHUYANOV, A., inzh.

Change-over to a 7-hour workday and a new system of remuneration.
Mias.ind.SSSR 31 no.1:40-42 '60. (MIRA 13:5)
(Meat industry) (Wages and labor productivity)

CHUYANOV, A.; TOLKACHEV, M.

Answers to the questions on labor and wages. Mias.ind.SSSR 31 no.5:52 '60. (MIRA 13:9)
(Meat industry) (Wages and labor productivity)

CHUYANOV, A.; TOLKACHEV, M.

Replies to the questions on labor and wages. Mias.ind.SSSR 31 no.3:56-57 '60. (MIRA 13:9)
(Meat industry) (Wages and labor productivity)

CHUYANOV, A.; TOLKACHEV, M.

Answers and questions concerning labor and wages. Mias. ind. SSSR 31 no.4:55-56 '60. (MIRA 14:7)
(Meat industry)
(Wages)

CHUYANOV, A.

Answering queries about labor legislation. Mias.ind. SSSR 33 no.3:57 '62. (MIRA 15:7)

(Labor laws and legislation)

CHUYANOV, P.I., [illegible]

Calculations for establishing norms and plans with punched card computers. Vest. mashinostr. 42 no.9:79-82 S '62. (MIRA 15:9)

(Gorkiy--Industrial management)
(Gorkiy--Punched card systems)

CHUYENKOV, V. A.

"On the Theory of Change of Dielectric Strength of Ionic Crystals," pp 45-67, ill, 16 ref

Abst: An attempt is made to establish a theory for the disturbance of dielectric strength of ionic crystals on the basis of the intergral-differential equation of Boltzmann. A criterion is obtained for the change in dielectric strength.

SOURCE: Izvestiya Tomskogo Politekhn. In-ta im. S. M. Kirova (News of the Tonsk Polytechnic Institute imeni S. M. Kirov), Volume 91, Works of the Conference on Solid Dielectrics, Tomsk, September 1955, Tomsk, Publishing House of the Polytechnical Institute, 1956

Sum 1854

C Huy Anov, V. A.

PHASE I BOOK EXPLOITATION SOV/4454

Moscow. Universitet. Kafedra atomnogo yadra

Nekotoryye matematicheskiye zadachi neytronnoy fiziki (Some Mathematical Problems in Neutron Physics) [Moscow] Izd-vo Mosk. univ-ta, 1960. 219 p. Errata slip inserted. 5,000 copies printed.

Ed.: M.G. Zaytseva; Tech. Ed.: K.S. Chistyakova.

PURPOSE: This book is intended for nuclear physicists interested in the mathematical theory of neutron physics.

COVERAGE: The collection of 9 articles was written during the period 1951 - 1955 by students of the Nuclear Physics Department of Moscow State University. The articles deal with the theory of kinetic equations of neutron physics. They should not be regarded as theses but as students' theoretical works which may contain new generalizations and examples of computations, some of which may require further proof. The articles are mathematical in nature and, in general, deal with the problem of setting up and working out approximation methods of solving kinetic equations. A critical review of the articles is given in the foreword by Ye. Kuznetsov, who supervised the work and who, with the assistance of T.A. Germogenova and M.V. Maslennikov, edited the collection. Tables, figures, and references accompany the articles.

AVAILABLE: Library of Congress (QC721.M67)

5

21 (9)

AUTHOR: Chuyanov, V. A. SOV/89-7-1-10/2

TITLE: A Multigroup Calculation of the Reactor of the Atomic Power Plant by Means of the Rapid Electronic Computer "Strela" (Mnogogruppovoy raschet reaktora atomnoy elektrostantsii na bystrodeystvuyushchey elektronnoy schetnoy mashine "Strela")

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 1, pp 64-65 (USSR)

ABSTRACT: By means of the multigroup method (Refs 1, 2) the following was calculated: k_{eff}, neutron flux for the homogenized reactor of the atomic power plant working under load; in the radial direction, the reactor consists of 3 zones, the upper and lower reflector being taken into account by the introduction of an "additional height". k_{eff} and the spatial energy distribution of the neutron flux are calculated by successive approximation. The difference equations for each neutron group are solved by means of the difference factorization method. All problems mentioned were programmed for the "Strela" computer. Calculation of k_{eff} and of all neutron flux values took 6.5 minutes, a 5-group variation with 100 points being adjusted along the radius. In

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order to attain an accuracy of 0.01 % for k_{eff}, 9 iterations are necessary: 1. Dependence of the upper and lower limit of k_{eff} on the iteration number n (5 groups, 15 computation points along the radius). 2. Dependence of k_{eff} on the group number N, which was used for computations. 3. Thermal neutron flux distribution computed with 2, 3, 5, and 20 groups. The boundaries of the 3 zones are plotted. 4. Comparison of thermal neutron flux distribution: a) computed with 20 groups, b) according to reference 1 (the boundaries of the 3 zones are plotted). Ye. S. Kuznetsov supervised the work. The results were discussed with G. I. Marchuk. O. K. Turchaninov carried out computations on the computer and made the drawings. There are 4 figures, 1 table, and 4 Soviet references.

SUBMITTED: April 24, 1959

ACCESSION NR: AP4012002 S/0208/64/004/001/0035/0051

AUTHOR: Chuyanov, V. A. (Moscow)

TITLE: Inverse problem in nuclear reactor theory

SOURCE: Zhurnal vy*chisl. matem. i matem. fiz., v. 4, no. 1, 1964, 35-51

TOPIC TAGS: nuclear reactor, inverse problem, neutron interaction, neutron flow, successive approximation, critical dimension, critical concentration

ABSTRACT: The inverse problem in nuclear reactor theory is the determination of the make-up of the reactor as a function of the properties desired of the neutron flow in it. The author gives sufficient conditions for the existence of a solution of the inverse problem. In order to show that under certain conditions the solution of this problem exists and is unique (and to show how it is constructed) he considers the case where the characteristics of interaction of neutrons with nuclei do not depend on the neutron velocity and for complete neutron flow of all velocities one can write the integral equations of Payyerls in a given form. He uses a method of successive approximation to construct the solution. He also proves uniqueness. "The author is very grateful to E. S. Kuznetsov for his interest in the work and to V. M. Maslennikov for many productive discussions." Orig. art. has: 54 formulas and 1 table.

Card 1/2

MOSKALEV, O.B.; CHUYANOV, V.A.

Existence and uniqueness of the solution to certain nonlinear problems in the theory of nuclear reactors. Dokl. AN SSSR 153 no.5:1030-1036 D '63. (MIRA 17:1)

1. Predstavleno akademikom S.L. Sobolevym.

MOSKALEV, O.B.; CHUYANOV, V.A.

Some nonlinear problems in nuclear reactor theory. Atom. energ. 18 no.3:254-255 Mr '65. (MIRA 18:3)

MELYAYEV, N.; IVASHKO, G.B.; CHUYCHENKO, I.A.

Principal tasks in designing servo systems. Uch. zap. Turk. gos. un. no.22:33-41 '62. (MIRA 18:11)

Chuyenko, L.I.

USSR/ Analytical Chemistry. Analysis of Inorganic Substances. G-2

Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27151.

Author : L.I. Chuyenko, M.V. Freyde.

Inst : All-Union Scientific Research Institute of Geology.

Title : Determination of Strontium and Barium in Barytic Rocks Containing either No Calcium, or Small Amounts Thereof.

Orig Pub: Inform. sb. Vses. n.-i. geol. in-ta, 1956, No. 3, 128 - 131.

Abstract: The quantitative determination of alkali elements is carried out by precipitation of $BaCrO_4$ and separation of moist nitrates of Sr and Ca by the acetone method, if their contents in the sample were small (1 to 3% of Sr and tenths of a percent

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USSR/ Analytical Chemistry. Analysis of Inorganic Substances. G-2

Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27151.

of Ca). After the precipitation of $BaCrO_4$, the filtrate is acidified with HCl, 2 to 4 ml of 1.5%-ual $CaCl_2$ solution, saturated $(NH_4)_2C_2O_4$ solution and ammonia are added, the mixture is boiled and kept in a warm place 2 to 4 hours. The oxalates are filtered off, washed, dissolved in HNO_3 and precipitated again. The reprecipitated oxalates are filtered off 2 to 3 hours later, washed and calcined into oxides, which are dissolved in HNO_3 and condensed by evaporation to the state of moist salts. If the content of CaO was $\leq$ 0.03 g and that of SrO was $\leq$ 0.05 g, 20 to 25 ml of acetone are added and stirred energetically 2 to 3 hours in cool. The insoluble residue of $Sr(NO_3)_2$ is filtered off, washed with acetone 4 to 5 times, dissolved in water and precipitated

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Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27151

with sulfuric acid (1 : 1); the precipitate of $SrSO_4$ is calcined until its weight remains constant and weighed. The acetone solution is evaporated, HNO_3 is added and it is diluted with water; Ca is precipitated with ammonium oxalate; the precipitate is calcined until it is converted in CaO.

KNIPOVICH, Yuliya Nikolayevna; KRASIKOVA, V.M.; CHUYENKO, L.I.

Determination of indium in minerals. Inform. sbor. VSEGEI no.18: 11-30 '59. (MIRA 13:11)
(Indium--Analysis) (Minerals)

CHUYENKO, L.I.

Plans of complete analysis of tungsten minerals. Inform.sbor. VSEGEI no.51:113-126 '61. (MIRA 15:8)
(Tungsten--Analysis)

SYRITSO, L.F.; CHUYENKO, L.I.

Chillagite from the Spokoynoye deposit (eastern Transbaikalia).
Vest. LGU 19 no.12:162-165 '64 (MIRA 17:8)

LIKHACHEV, Yu.A.; VLADIMIRSKIY, V.S.; MALOVA, E.V.; SHUL'TS (mladshiy), S.S.; MAKAROVA, Z.A.; SINCHUGOVA, T.A.; CHUYENKO, P.P., red.; FEDOTOVA, M.I., vedushchiy red.; DEM'YANENKO, V.I., tekhn.red.

[Paleozoic tectonics of the Kyzyl Kum basement] Tektonika paleozoiskogo fundamenta Kyzylkumov. Leningrad, Gostoptekhizdat, 1963. 117 p. (Leningrad, Vsesoiuznyi geologicheskii institut. Trudy, vol. 105. Problema neftegazonosnosti Srednei Azii, no.15). (MIRA 17:3)

SYTIN, Yu.I.; CHIKHACHEV, P.K.; CHUYENKO, P.P.

Basic features of the tectonics and the development of the structures of the western part of Central Asia. Trudy VSEGEI 42:7-37 '60. (MIRA 14:9)

(Soviet Central Asia--Geology, Structural)

ANTSUTA, Ye.B., arkhit.; KIRILLOV, N.P., arkhit.; KUZNETSOV, V.V., arkhit.; SLOTINTSEVA, M.N., arkhit.; PYATIN, S.G., inzh. Prinimali uchastiye: CHUYENKO, R.G., arkhit.; MOSEVICH, Ya.Ya., arkhit.; GLAZKOV, F.I., st. tekhnik; GOLUKHOV, G.I., inzh.; SAMSONOVA, T.T., inzh.; KOLESOVA, Ye.Ye., st. tekhnik; MAKAROVA, T.N., tekhnik; SHAMBAT, M.S., inzh.; SEMENOVA, G.V., inzh.; PLATUNIN, Yu.S., gr. inzh.; VOL'NOVA, T.F., tekhnik; SOLOV'YEV, M.I., inzh.; MOREV, I.A., tekhnik.

[Two-apartment house with two-room apartments; standard plan 1-102-5] Dvukhkvartirnyi zhiloi dom, kvartiry v dve komnaty; tipovoi proekt 1-102-5. Moskva, Al'bom 1. 1960. 27 p. (MIRA 14:10)

1. Moscow. TSentral'nyy institut tipovykh proyektov.
(Apartment houses—Designs and plans)

CHUYENKO, V.S., kand.sel'skokhozyaystvennykh nauk

"Forest valuation" by I.P.Anuchin. Reviewed by V.S.Chuenkov.
Agrobiologiia no.2:316 Mr-Ap '62. (MIRA 15:4)
(Forest and forestry—Valuation) (Anuchin, I.P.)

CA

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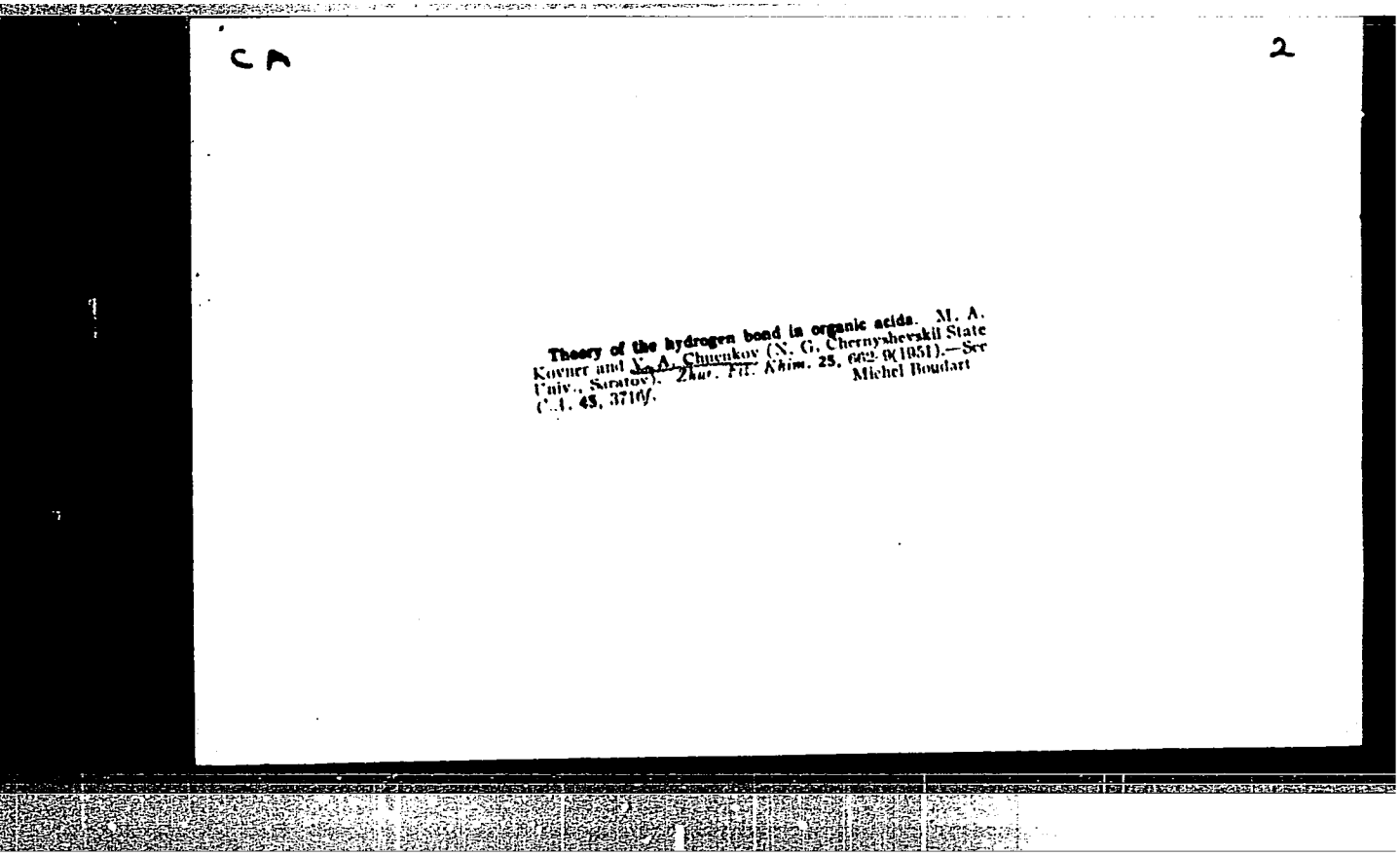
Theory of hydrogen bonds in dimeric organic acids. M. A. Kovner and V. A. Chuenkov (Saratov Univ.) *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 14, 435-41(1950).—Theoretical. A 2-min. scheme of potential curves is introduced to explain the appearance of doublet lines in Raman spectra, discovered by Batuev. The distance between the lines depends on the height of the potential barrier between the min. This relationship is plotted for formic, acetic, and isovaleric acids. S. Pakswer

1951



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2

Theory of the hydrogen bond in organic acids. M. A. Kovner and Ya. A. Chuenkov (N. G. Chernyshevskii State Univ., Saratov). *Zhur. Fiz. Khim.* 25, 662-9(1951).—See *C.A.* 45, 3710f. Michel Boudart

CHUYENKOV, V. A.
Dielectrics

Dissertation: "The Limit of Electrical Stability of Solid Dielectrics and the Formation of Electrical Spark-Over." Cand Phys-Math Sci, Physics Inst imeni P. N. Lebedev, Acad Sci USSR, Oct-Dec 1953. (Vestnik Akademii Nauk Moscow, Mar 54)

SO: SUM: 213, 20 Sep 1954

CHUYENKOV, V. A.

USSR/ Physics - Dielectrics

Card 1/1 Pub. 118 - 1/9

Authors : Chuenkov, V. A.

Title : The modern status of the theory interpreting the puncture of solid dielectrics

Periodical : Usp. fiz. nauk 54/2, 185-231, Oct 1954

Abstract : The modern status of the theory on the spark-over process through a solid dielectric (crystal) is considered. A critical analysis of many modern theories on the mentioned subject is presented. All theories are divided into two groups: 1) those theories which consider the puncture of a dielectric as a phenomenon of the destruction of its electric durability and 2) those which consider the same phenomenon (puncture) as a mechanical destruction. Sixty-six references 31-USSR (1927-1953). Graphs; tables.

Institution : ...

Submitted : ...

CHUYENKOV, V. A.

"On the Theory of Disturbance of the Dielectric Strength of Solid Dielectrics," pp 65-125, ill, 72 ref

Abst: The author examines present ideas on the mechanism of electrical breakdown. It is shown that it is necessary to divide the phenomenon of electrical breakdown of solid dielectrics into two phases: the disturbance of dielectric strength and breakdown of the material. Losses of dielectric strength are the beginning of the breakdown and serve as the origin of all subsequent processes. This work is related to the problem of determining the conditions of disturbance of the dielectric strength of dielectrics.

SOURCE: Trudy Fizicheskogo In-ta im. P. N. Lebedev (Works of the Physics Institute imeni P. N. Lebedev), Volume 8, Moscow, Publishing House of the Academy of Sciences USSR, 1956

Sum 1854

CHUYENKOV, V.

Theory of electrophysical properties of germanium. B. I. Adirovich, O. M. Guro, V. F. Kulshov, and V. A. Chuenkov. *Trudy Fiz. Inst., Akad. Nauk S.S.S.R., Fiz. Inst. im. P. N. Lebedeva* 8, 127–77(1956).—A contribution is made to the theoretical development of the dependence of cond., σ, Hall coeff., R, and nonequil. charge carriers, τ, on temp., concn. of impurities, and structural defects of Ge. Variation of position of Fermi's level with temp. at different compns. is also treated. A. Libeskind

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SOV/112-58-2-1845

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1958, Nr 2, pp 7-8 (USSR)

AUTHOR: Chuyenkov, V. A.

TITLE: On the Theory of Disturbance of Electric Strength of Ionic Crystals (K teorii narusheniya elektricheskoy prochnosti ionnykh kristallov)

PERIODICAL: Izv. Tomskogo politekhn. in-ta, 1956, Vol 91, pp 45-67

ABSTRACT: Modern breakdown theories are single-electron theories. A strict criterion of disturbance of electric strength can be obtained by considering all electrons that take part in the breakdown and distributing them according to their energies. The author subdivides all possible values of electron energy into four regions: (1) $0 \leqslant \mathcal{E} < \hbar\omega_0$, where $\hbar$ is the universal Planck constant, ω is the frequency of shortwave longitudinal optic oscillations; (2) $\hbar\omega_0 \leqslant \mathcal{E} \leqslant \mathcal{E}''$, where $\mathcal{E}''$ is the minimum energy necessary for an electron to be accelerated by the field; (3) $\mathcal{E}'' < \mathcal{E} < I$, where I is the ionization potential; and (4) $\mathcal{E} \geqslant I$. The function of energy distribution of conduction electrons is solved separately for each region except for (1). Two characteristic $\mathcal{E}$ values are introduced: $\mathcal{E}_{\frac{1}{2}}$ is the energy above and below which equal amounts of electrons

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On the Theory of Disturbance of Electric Strength of Ionic Crystals

are yielded after ionization, and $\mathcal{E}_p$ which corresponds to the energy received by an electron from the field in a unit of time which is equal, on the average, to the energy transmitted by the electron to the lattice. With $\mathcal{E}_i = \mathcal{E}_p$, an ionizing event results in yielding more than one free electron, on the average, and the number of ionizing events grows continuously, causing breakdown of the dielectric. The equality $\mathcal{E}_i = \mathcal{E}_p$ is assumed by the author to be the condition of electric-strength disturbance. Effective ionization cross-section for alkali-halide crystals has been determined from experimental values of $\mathcal{E}_{pr}$ and is approximately equal to $10^{-16}cm^2$. Order of values of $\mathcal{E}_{pr}$ for alkali-halide crystals and dependence of $\mathcal{E}_{pr}$ on temperature well agree with the experiment. For dielectrics thinner than 10^{-4}cm, and also for voltage-application time shorter than 1.48×10^{-7}sec, strengthening can be expected. The dielectric destruction stage is described. Bibliography: 16 items.

Fizich. in-t im. P.N. Lebedeva, AN SSSR (Institute of Physics imeni P.N. Lebedev, AS USSR), Moscow.

A.A.V.

CHUYENKOV, V.A.

Theory of the electric strenght of germaium and silicon. Izv.AN SSSR. Ser.fiz. 20 no.12:1550-1552 D '56. (MLRA 10:3)

1.Fizicheskiy institut im. P.N. Lebedeva Akademii nauk SSSR.
(Germanium--Electric properties)
(Silicon--Electric properties)

CHUYENKOV, V. A.

"Physics of Solid and Liquid Dielectrics," by V. A. Chuyenkov, Candidate of Physicomathematical Sciences, Vestnik Akademii Nauk SSSR, Vol 26, No 11, Nov 56, pp 107-108

"The Physics Institute imeni P. N. Lebedev and the Dnepropetrovsk University conducted from 20 to 27 August 1956 an All-Union Conference on the Physics of Solid and Liquid Dielectrics. Representatives of the Tomsk and Leningrad polytechnic institutes, of Tomsk University, and of other organizations -- altogether 200 persons -- also participated in the conference.

"Investigation of the properties of solid and liquid dielectrics is very important for understanding their internal structure and the physics of processes which take place in matter under the action of an electric field. This is particularly important in connection with the fact that electrical engineering and radio-engineering make increasing demands as far as the materials used in these fields are concerned; at present, dielectrics are required which have a high dielectric and mechanical strength, possess a high dielectric permittivity, and do not exhibit high dielectric losses.

"One can see from this that the development of materials with predetermined properties is of great importance. To successfully conduct work along these lines, many-sided experimental and theoretical investigations in the field of the physics of dielectrics are necessary. These investigations must comprise the measurement of the dielectric properties of materials in an extensive range of temperatures and frequencies, including very high frequencies. However, at present there are no well-developed methods for the determination of dielectric characteristics in the centimeter and millimeter ranges of frequencies, as well as in the far infrared region. Furthermore, it is very desirable to develop new methods of measurement which would make it possible to study various properties of dielectrics with the aid of a single appartus which makes possible determinations in an extensive range of frequencies.

"The solution of these problems, which are often very complex, requires a well-organized effort on the part of many scientific teams which study the physics of dielectrics.

"The conference that was held had the purpose of summarizing the results of work on the physics of dielectrics done in the Soviet Union and of uncovering shortcomings in this field, indicating ways for eliminating these shortcomings. The papers presented demonstrated that in a number of organizations, important research is being done on polarization and dielectric losses in dielectrics, the physicochemical properties of dielectric

materials, dielectric failure, electrical conductivity, the development of new methods of research (including research in the range of high frequencies), phenomena connected with the existence of electrets, and the development of new materials and their applications. This research is of great interest from the scientific standpoint and in a number of cases also of great importance from the standpoint of practical applications.

"Notwithstanding all this, substantial shortcomings exist in the organization of research on the physics of dielectrics. Because of the lack of coordination between work done by various scientific research organizations, some of the work being conducted lacks adequate scientific and practical aims. An insufficient amount of research on the theoretical aspects of the physics of dielectrics has been done up to now. Of 70 reports presented at the conference, only 9 dealt with theoretical problems. Furthermore, there are too few USSR monographs on the physics of dielectrics, the results reported in the periodical literature are not being summarized, and the best foreign monographs are not being translated.

"Much remains to be done as far as the application of the newest methods of investigation (neutronography, nuclear magnetic resonance, paramagnetic resonance, and the effect of radiation on the properties of dielectrics) is concerned. The results of work that has been completed must be introduced more rapidly into the industry.

"Unfortunately, not all industrial plants and specialized branch institutes which do work on the physics of dielectrics and on its practical applications were represented at the conference.

"To expedite further work on the physics of dielectrics and to improve the coordination of research in this field, the conference recommended that the Presidium of the Academy of Sciences USSR be requested to restore the Commission on Dielectrics at the Bureau of the Department of Physicomathematical Sciences. Furthermore, the conference decided that it is necessary to hold regularly all-union conferences on the physics of dielectrics (at least once every 1.5-2 years). The next conference is planned for the period May-June 1958. It will be held in Moscow and foreign scientists will be invited to attend. To popularize work on dielectrics, the conference recommended that a new periodical entitled Dielectrics and Semiconductors be published and that the transactions of the conference also be published.

"In conclusion, one may note that the conference was conducted on a sufficiently high scientific level. The reports presented were subjected to a thorough discussion and to matter-of-fact criticism. The fact that many young people were present at the conference may be regarded as a good sign."

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CHUYENKOV, V. A.

Chuyenkov, V.A. [Fizicheskiy institut imeni P.N. Lebedeva AN SSSR (Physical Institute imeni P.N. Lebedev, AS USSR)] The Deduction of Criteria for the Disruption of the Electrical Stability of Ionic Crystals From a Kinetic Equation

(The Physics of Dielectrics; Transactions of the All-Union Conference on the Physics of Dielectrics) Moscow, Izd-vo AN SSSR, 1958. 245 p. 3,000 copies printed.

This volume publishes reports presented at the All-Union Conference on the Physics of Dielectrics, held in Dnepropetrovsk in August 1956, sponsored by the "Physics of Dielectrics" Laboratory of the Fizicheskiy institut imeni Lebedeva An SSSR (Physics Institute imeni Lebedev of the AS USSR), and the Electrophysics Department of the Dnepropetrovskiy gosudarstvennyy universitet (Dnepropetrovsk State University).

AUTHOR: Chuyenkov, V. A. 48-22-4-1/24

TITLE: The Behaviour of Germanium-Type Valence Crystals in Strong Electric Fields (Povedeniye valentnykh kristallov tipa germaniya v sil'nom elektricheskom pole)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1958, Vol. 22, Nr 4, pp. 363-368 (USSR)

ABSTRACT: The author investigated germanium-type valence crystals, the conduction zone of which is at least twice as wide as the forbidden zone. (Germanium and silicon satisfying this condition. In germanium the width of the valence zone amounts to about 20 eV (reference 1) - the conduction zone being even wider and the forbidden zone having a width of about 0,75 eV). The distribution function of the conduction electrons in a strong electric field, taking into consideration the electron scattering on optical and acoustic lattice vibrations, the ionization by means of electronic impact, the generation (heat generation, Ziner effect, Frenkel' effect) and the recombination can

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be represented in the form

$$f(\varepsilon,\theta) = f_0(\varepsilon) + f_1(\varepsilon)\cos\theta,$$

at $\varepsilon > \hbar\omega_0$ (ε denoting the electron energy and ω_0 the frequency of the optical lattice vibrations). As in valence crystals the probability of the electron scattering on the lattice vibrations increases with increasing electron energy, the electrons with a mean energy $\varepsilon < \varepsilon_p$ are accelerated by the field, and electrons with $\varepsilon > \varepsilon_p$ as a mean value are slowed down by the lattice,

$$\frac{d\varepsilon_p}{dE} > 0 .$$

It is obvious, that the electrons entering the range $\varepsilon_p < \varepsilon_1$ at $0 < \varepsilon < \varepsilon_p$ on the average cannot reach such values of ε because of ionization, which would enable them to ionize again (at $\varepsilon < \varepsilon_1$ the scattering on lattice vibrations is most probable). In this case only a

relatively small number of electrons enters the range $\varepsilon > \varepsilon_1$, by means of fluctuations. It is obvious, that under these conditions no electron avalanche can develop. On the other hand the electrons entering the range $\varepsilon_p > \varepsilon_1$ at $0 < \varepsilon < \varepsilon_p$ are accelerated because of ionization to such values enabling them to ionize again. Therefore in this case conditions are created for the formation of an electron avalanche and for a disturbance of the dielectric strength of the crystal. For this reason the condition $\varepsilon_p(E_{cr}) = \varepsilon_1$ can be regarded as a criterion of the disturbance of the dielectric strength of valence crystals of germanium type. The experiments of the breakdown of wide p - n transitions (reference 5) give a value of $E_{cr} = 9 \cdot 10^4$ V cm^{-1} for germanium at room temperature. From this the parameter $s_0\beta = 1{,}65 \cdot 10^{35}$ (in the c. g. s.

system) can be evaluated. If the effective ionization cross section at $\mathcal{E} \approx 31$ is taken to be 10^{-16} cm^2, then $S_o \approx 10^{-4}$ and $\beta \approx 1{,}8 \cdot 10^{39}$. When β is known, for the width of the valence zone in germanium the value of about 20 eV is obtained, corresponding to other data (reference 1). The value $E_{cr} = 6{,}6 \cdot 10^5$ V cm^{-1} is obtained for silicon at identical $S_o\beta$ at $T = 300^\circ$K. The computations show, that E_{cr} increases linearly with temperature. This corresponds to experimental data (references 6 and 7). Yet the theory shows a sharper increase of E_{cr} with temperature. The less marked increase of E_{cr} with temperature observed in the experiments can be explained by the fact, that the experimental data were obtained in the breakdown of sharp p - n transitions, here higher values of E being possible than in a homogenuous semiconductor for which the computations are valid. The theory permits to explain a number of experimental data on the behaviour of semiconductors in

The Behaviour of Germanium-Type Valence Crystals in Strong Electric Fields

48-22-4-1/24

a strong electric field. Therewith it is assumed, that the electron possesses a certain effective scalar mass m^*, with its value being between that of the longitudinal and the transverse mass. There are 7 references, 3 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev, AS USSR)

AVAILABLE: Library of Congress

1. Germanium crystals--Electrical properties 2. Electrons --Scattering 3. Magnetic fields--Ionizing effects

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AUTHOR: Chuyenkov, V. A.

TITLE: On the Deduction of the Disturbance Criterion of Dielectric Strength in Ionic Crystals From the Kinetic Equation (K vyvodu kriteriya narusheniya elektricheskoy prochnosti ionnykh kristallov iz kineticheskogo uravneniya)

PUBLICATION: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1958, Vol. 22, Nr 4, pp. 369-376 (USSR)

ABSTRACT: At present it is possible to assume on the strength of a great number of experimental data, that the electric breakdown of solid dielectrics takes place because of the ionization of atoms of the dielectric, by means of electron impact and the formation of an electron avalanche. In 1940 Akhiyezer and Lifshits (ref 1) pointed to the fact, that the most rigorous condition in the disturbance of dielectric strength of the dielectric can be derived from the solution of a corresponding kinetic equation. In the present paper the author attempts to show by means of a rigorous solution of the kinetic equation taking into consideration the recombination processes, that the disturbance criterion of dielectric

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strength (reference 2) immediately proceeds form the kinetic equation. He investigated a homogenous dielectric with a conduction zone at least twice as wide as the forbidden zone (only in this case the method of effective mass is applicable). The modifications in the electron number in the phase space because of collisions leading to excited states, were not considered on the strength of the mentioned causes (reference 2). The totality of the ε-values was divided into two domains:

1) $0 < \varepsilon < I$

2) $\varepsilon > I$.

At first the domain $0 \leqslant \varepsilon \leqslant I$ was investigated. (I denoting the ionization potential or the width of the forbidden zone.) The computations were conducted according to the method given in references 2 and 3. The computation of the kinetic equation in the domain $\varepsilon \geqslant I$ can be limited to the consideration of the effects of the external field and of the transition of the electrons into the domain $0 \leqslant \varepsilon \leqslant I$ because of ionization (this holding at $E \geqslant 10^5 V\ cm^{-1}$). In

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order to find the field strength $E = E_{cr}$ [illegible] when the steady solution of the kinetic equation is impossible and the dielectric strength is disturbed two characteristic quantities were introduced. In the steady case they have a certain physical meaning: 1) $\varepsilon_{1/2}$ - denoting such an energy value at which an equal number of electrons per unit time enters the domains above or below because of ionization. 2) ε_p such an energy value, at which the electron on the average receives the same amount of energy from the field as it gives away to the lattice per unit time. It was stated, that the mean energy of the electrons after ionization increases with a voltage rise. Therefore the quantity $\varepsilon_{1/2}$ must increase with an increase of E. However, the quantity ε_p must be reduced at an increase of E, as in ionic crystals the probability of electron scattering on the lattice vibrations increases with the energy reduction (reference 2). From this it can be concluded, that the electrons with a means value of $\varepsilon > \varepsilon_p$ are accelerated by the field, and the electrons with a mean value of $\varepsilon < \varepsilon_p$ are

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slowed down by the field. The theory agrees with the experimental data of E_{cr} for alkali-halide crystals at reasonable values of the effective ionization cross section. The dependence of E_{cr} on the temperature furnished by the theory also corresponds to experimental values for KBr, the values being obtained by breakdown (pulses with a duration of 10^{-7} seconds; figure 2) As to the dependence of E_{cr} on various lattice parameters, it is characterized as follows: E_{cr} increases at a reduction of the reduced mass of the ions, M, of the lattice constant, a, of the lattice frequency ω and decreases at a decrease of the effective electron mass m^*. The dependences enumerated here appear to be reasonable from the physical point of view. The evaluations conducted on the basis of the found electron distribution function show, that the ionization of the impurities only then exerts influence on the dielectric strength of the dielectrics, when their concentration exceeds

$\geq 10^{18}$ cm^{-3}.

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There are 2 figures and 8 references; 7 of which are Soviet.

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1. Crystals--Dielectric properties 2. Dielectrics--Mathematical analysis

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AUTHOR: Chuyenkov, V. A. 48-22-4-5/24

TITLE: Discussion on Lectures by V. A. Chuyenkov, Yu. I. Gorkun and K. B. Tolpygo (Preniya po dokladam: V. A. Chuyenkova, Yu. I. Gorkuna i K. B. Tolpygo)

PERIODICAL: Izvestiya Akademii Nauk SSSR Seriya Fizicheskaya, 1958, Vol. 22, Nr 4, pp. 385-386 (USSR)

ABSTRACT: Chuyenkov answered critical remarks by the participants of the discussion. The assertion of Balygin, stating that the theory of dielectric breakdown of valence (atomic) crystals is wrong, is supposed to be based on a misunderstanding. It appears quite clearly from this theory, that the energy loss of electrons in valence crystals equals $B = a_1\varepsilon^{1/2}$ in the case of low energies and $B = a_2\varepsilon^{3/2}$ in the case of high energies (ε denoting the electron energy.). His remark as to the dependence of the dielectric strength on temperature is also regarded to be unclear. It is possible to compute the dependence of the breakdown voltage on temperature from the formulae given in the lecture. Even diagrams of this dependence are given. In the here given theory the author attempted to avoid the deficiencies of the theories by Khippel' and Frelikh. As a result

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the disturbance criterion of dielectric strength was obtained giving data of breakdown voltage corresponding to experimental data and its dependence on temperature in the case of a pulse breakdown, if the heat effects actually had been removed. The theory furnishes a physically correct dependence on the lattice parameters. Chuyenkov answers the remarks by Skanavi that in the corrected variant the recombination was taken into consideration. It should be mentioned with respect to the effective ionization cross section, that in the total domain $\mathcal{E} \gg I$ ($\mathcal{E}$ denoting the electron energy, I denoting the ionization potential) the most important values of $\mathcal{E}$ are such, where $\mathcal{E} - I \ll I$ because at $\mathcal{E} - I \approx I$ the distribution function practically equals zero. Answering Tolpygo Chuyenkov stated, that only electrons with a very low energy can be in polaron state. In a weak electric field, at room temperature, the majority of electrons is in polaron state. In fields near the breakdown strength the majority of electrons is in zonal state. At the same time in these fields a number of electrons with an energy $\mathcal{E} \gg I$ is observed, from this reason the ionization by electronic impact begins to play an important role. A criterion was proposed in the lecture, corresponding to which